REMARKS

The application has been amended and is believed to be in condition for allowance.

Drawing Figure 2 has been amended to more clearly show the features recited by claims 1 and 7.

The left portion of Figure 2 has been amended to show that a radial direction (DR) of the transmission belt (4) the rocking edge (12) at least partly coincides with the endless carrier (9). That right portion of Figure 2 has been amended to add plural radii (R1, R2, R3) showing the curvature of the rocking edge (12) is defined by a plurality of radii (R1, R2, r3) that continuously increase in a radially inward direction (DRi).

Claims 1-2 and 4-20 are pending.

There are no formal matters outstanding.

Claims 17-20 have been allowed and claim 4 has been indicated to be directed to allowable subject matter.

Claims 1 and 6-10 stand rejected under §102 as anticipated by KOBAYASHI JP 6-272737 (KOBAYASHI '737).

Claims 2, 5, 15, and 16 stand rejected under §103 as obvious over KOBAYASHI '737.

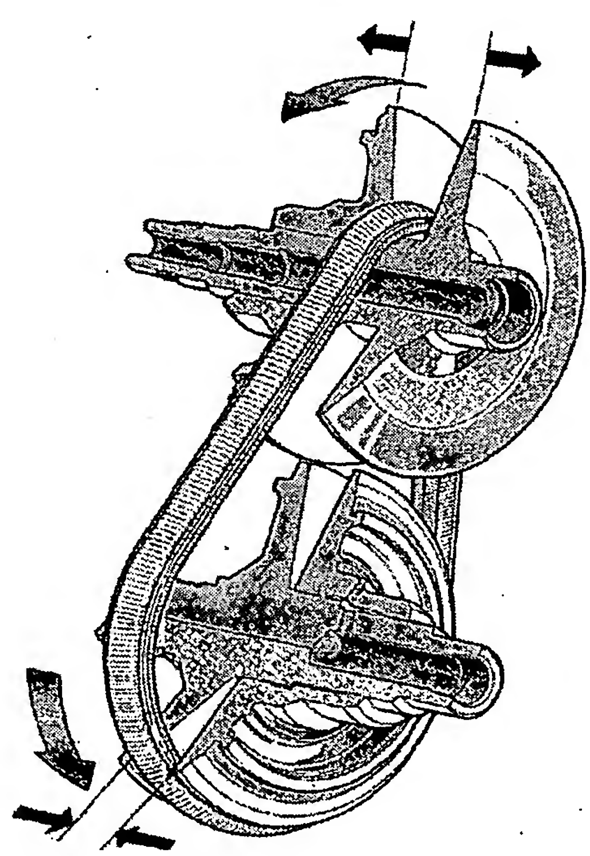
Claims 11-14 stand rejected under §103 as obvious over KOBAYASHI JP 6-272737 in view of KOBAYASHI 6,074,317 (KOBAYASHI '317).

Applicant notes that the curvature of the rocking edge of KOBAYASHI '737 was previously argued. This response continues that argument. A previous amendment noted "that the illustrated embodiment of JP 06-272737 is provided with a constant radius of curvature of 71.5 mm as seen in cross-section." Support for this position is provided below, together with an explanation of what KOBAYASHI '737 does disclose.

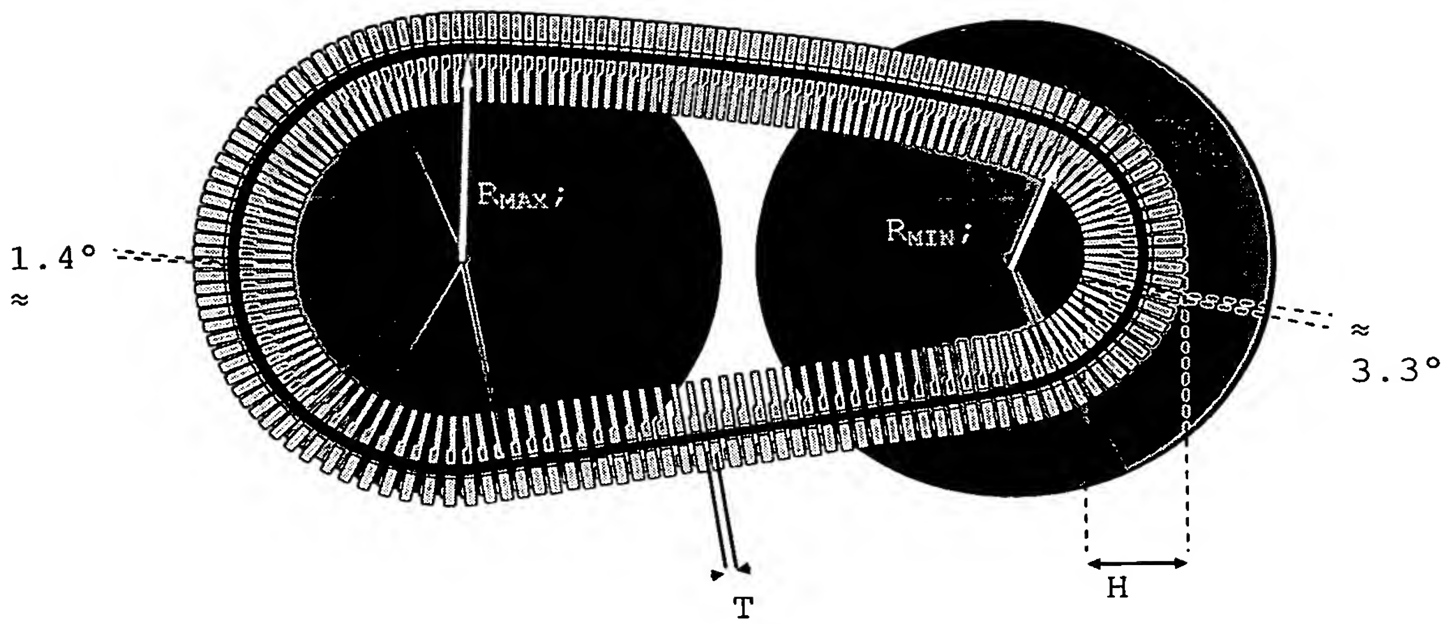
Below there is provided a discussion concerning convention CVT design and then a detailing of the KOBAYASHI '737 disclosure.

Conventional CVT (push belt and pulleys) design:

1) Perspective schematic view of CVT showing the push belt wrapped around the transmission pulleys.



2) Side elevation of CVT; Not to scale (e.g. belt height H and transverse element thickness T exaggerated):



The belt's transverse elements are provided with, **what is commonly denoted in the art**, a rocking edge, which is alternatively (and perhaps more accurately) denoted the tilting zone. Such rocking edge or tilting zone forms a transition between an upper part of the element that has an essentially constant thickness and a bottom part of the element that is tapered. It allows the adjacent elements in the belt to tilt with respect to one another, so that a belt part may assume a longitudinally curved trajectory between the discs of a pulley. Of course the amount of relative tilting between adjacent elements determines the amount of longitudinal bending of the said belt part, which is sometimes denoted the belt's "pitch radius".

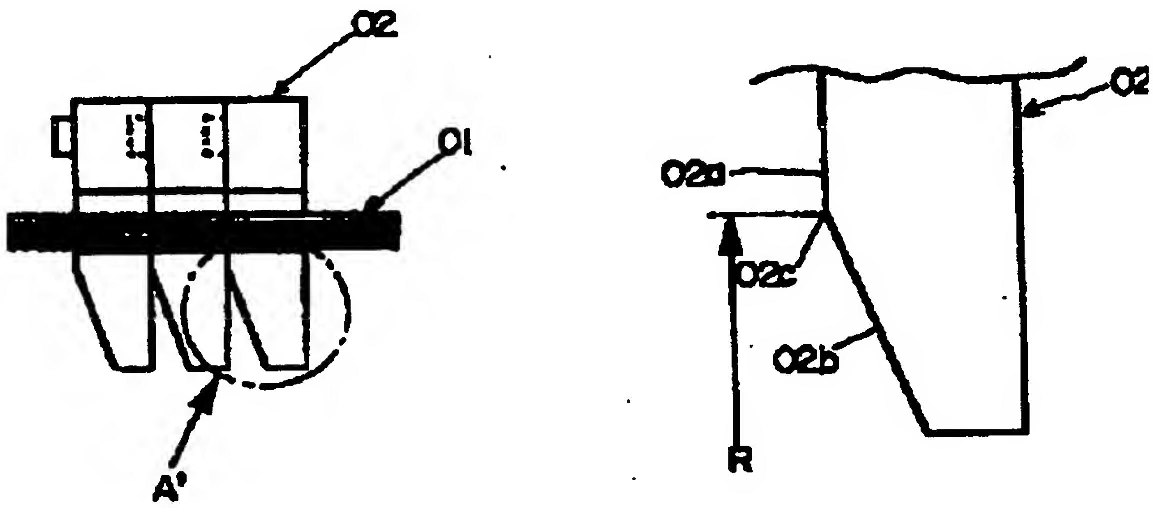
In the above-described CVT, the transmission (speed-)ratio is determined by the quotient of the belt pitch radius at (i.e. between the discs of) the primary pulley and at the secondary pulley, which is in fact determined by the radial location of a transversely oriented line of contact between adjacent transverse elements (i.e. the "contact line").

Typically the smallest pitch radius of the present belt-type R_{MIN} is about 33 mm and its largest pitch radius R_{MAX} is about 75 mm, providing a maximum transmission ratio of about 2.27 (75mm/33mm) and a smallest transmission ratio of about 0.44 (33mm/75mm), which latter transmission ratio is illustrated in the above figures.

These most extreme pitch radii are realized by a relative tilting between adjacent transverse elements of about 1.4 degrees for the largest belt pitch radius R_{MAX} and of about 3.3 degrees for the smallest belt pitch radius R_{MIN} (when calculated for a typical value for thickness T of the elements of about 1.75mm; see the second figure above).

Of course, the belt part located between the pulleys is longitudinally stretched, i.e. has an infinite pitch radius, whereby the adjacent transverse elements are oriented mutually parallel.

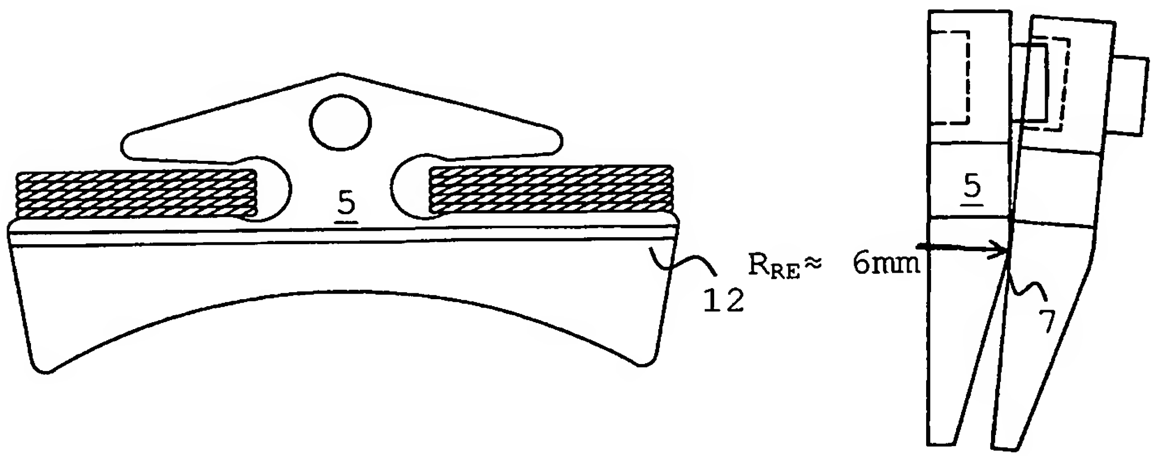
3) Side elevation of the *known belt* (cf. figs. 11 and 12 of KOBAYSHI '737):



In the prior art figure 12 of KOBAYSHI '737 the conventional rocking edge 02c is shown as a sharp edge, i.e. not being rounded off at all. In this transverse element design, the transversely oriented contact line between a leading and a trailing transverse element corresponds to the rocking edge of the trailing element and thus has a fixed radial position with respect to the element itself, e.g. exactly corresponding to the above-mentioned typical value of 75 mm at the largest pitch radius R_{MAX} of the belt and 33 mm at its smallest pitch radius R_{MIN}, i.e. irrespective of the tilting angle between the elements (belt pitch radius).

In practice, however, the rocking edge 12 of the conventional transverse element 5 is not a sharp knife's edge, but may be approximated by a smoothly rounded transition

curvature having, i.e. defined by a radius of curvature R_{RE} of about 6 mm (Hence the more appropriate term of "tilting zone").



In such practical design the contact line 7 between adjacent transverse elements 5 displaces slightly in radial direction in dependence on the tilting angle between the elements (belt pitch radius).

In fact, it can be calculated (e.g. using the equations provided in the application) that a radial displacement of such contact line, when the belt is bent from its largest pitch radius R_{MAX} to its smallest pitch radius R_{MIN}, approximately amounts to 0.2 mm. In other words, although the belt as a whole is curved at the pulleys in the same manner and by the same amount as before, the actual exact values of its pitch radii R_{MIN}, R_{MAX} will have changed slightly with respect to the element design incorporating a sharp, i.e. truly edge-like rocking edge. The smallest pitch radius R_{MIN} has become 32.9 mm (33mm - ½*(0.2 mm)) and the largest

pitch radius R_{MAX} has become 75.1 mm (75mm + ½*(0.2 mm)), thus the maximum transmission ratio is now about 2.28 (75.1mm/32.9mm), which represents an negligible and unnoticeable increase less than 0.5% with respect to the previously calculated maximum transmission ratio of 2.27. The same holds, mutatis mutandis, for the minimum transmission ratio.

KOBAYSHI '737 Disclosure

The rejections are not viable as KOBAYSHI '737 teaches a circular rocking edge, i.e., a rocking edge of a constant radius.

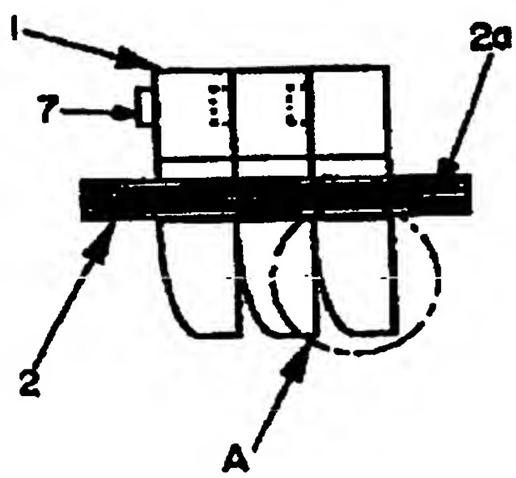
KOBAYSHI '737 discloses radial displacement of the contact line in dependence on the tilting angle between adjacent elements (belt pitch radius), whereby the maximum and minimum transmission ratio may be favourably expanded without having to expand/change the overall size of the transmission (that is without having to increase the (radial) dimensions of its pulleys), by providing the rocking edge with a (large) constant radius of curvature.

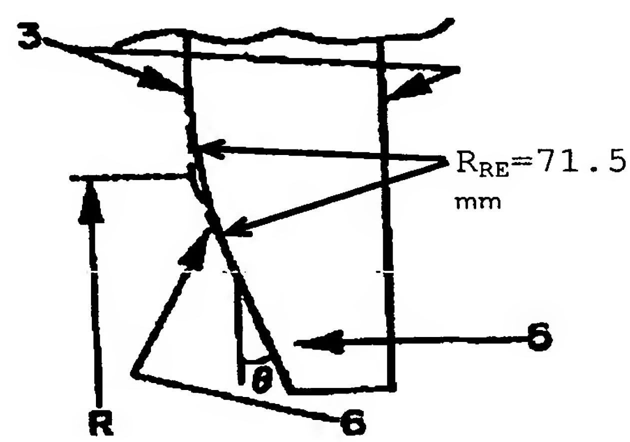
KOBAYSHI '737 also has realized that indeed a considerably larger radius of curvature of the rocking edge R_{RE} is required (e.g. 71.5 mm compared to the conventional 6 mm) for

the expansion effect on the transmission ratio to become noticeable and favourable.

KOBAYASHI '737 discloses a rocking edge 6 with a convex circular face. See the previously provided machine translation of KOBAYASHI '737. Note paragraphs 24 and 27 disclosing a large radius of 71.5mm.

KOBAYSHI '737 illustrates the example of an element having a rocking edge (i.e. "**circular** arc face 6" in terms of Kobayashi) **defined by a constant radius of curvature** R_{RE} of 71.5mm.





Based on the above numerical example, it may be calculated that with such a relatively large radius of curvature for the rocking edge (71.5 mm), the maximum transmission ratio increases by more than 5%, whereas the minimum transmission ratio decreases by approximately the same amount. This provides a noticeable and favourable increase of the total transmission ratio coverage of the transmission.

In Figure 4 of KOBAYSHI '737 the effect of such rocking edge shape is illustrated for the *minimum* relative tilting angle between adjacent elements (i.e. "when pulley turns into a major diameter" in terms of Kobayashi). From this figure it appears that largest pitch radius R_L of a belt provided with the Kobayashi elements has increased with respect to the largest pitch radius R of a belt provided with conventional elements having a sharp rocking edge.

In KOBAYSHI '737 Figure 5, the effect of such rocking edge shape is illustrated for the *maximum* relative tilting angle between adjacent elements. From this figure it appears that smallest pitch radius R_S of a belt provided with the Kobayashi elements has increased with respect to the smallest pitch radius R of a belt provided with conventional elements having a sharp rocking edge.

It is thus submitted that the parameters R, R_L and R_S discussed in Kobayashi are in fact related to, i.e., define, the pitch radius of belt, and do clearly not relate the curvature of the rocking edge itself as is erroneously suggested by the Official Action. In fact the radius of curvature of the rocking edge R_{RE} (i.e. "the circular arc face" curvature) is not indicated in the KOBAYSHI '737 drawings at all.

In view of the above, the statement from the Official Action that "This also means that the convex circular face of

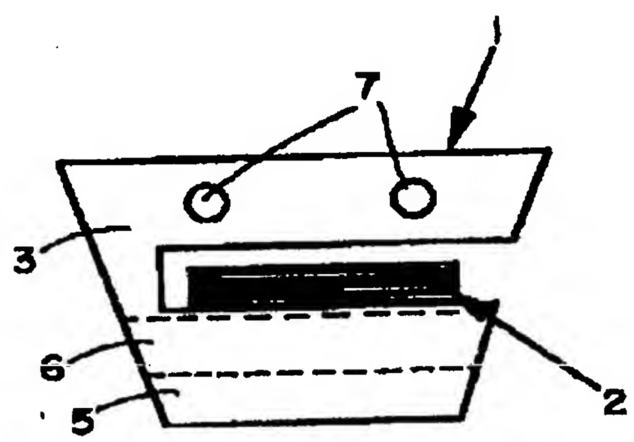
Kobayashi '737 does not have a constant radius R..." is wrong and moreover appears to include a contradiction (circular face <-> not a constant radius).

As KOBAYSHI '737 does not disclose any other shape for the rocking edge other than a circular arc shape having a constant radius of curvature, there is no disclosure of the recitation of "the curvature of the rocking edge (12) is defined by a plurality of radii (R) that continuously increase in a radially inward direction".

As there is nothing in KOBAYASHI '737 that teaches a non-circular curvature for rocking edge 6, the rejections should be withdrawn and the claims allowed. Reconsideration and allowance of claim 1 are respectfully requested.

Also, as to claim 7, the drawing figures of KOBAYASHI '737 show ***a flat portion of the element*** being coincide with the belts 2. Therefore, the claim 7 recitation of "... in a radial direction of the transmission belt (4) the rocking edge (12) at least partly coincides with the endless carrier (9)" is not seen as being anticipated.

Indeed, KOBAYASHI '737 Figure 1 shows the known placement and radial extent of the rocking edge 6 by the horizontal dashed lines, which known rocking edge 6 is entirely located radially inward from the endless carrier 2 and thus none of the rocking edge 6 is, in a radial direction of the transmission belt, at least partly coincides with the endless carrier".



Reconsideration and allowance of claim 7 is therefore also respectfully requested.

The present invention, as recited, is believed to be both novel and non-obvious over the prior art. Accordingly, reconsideration and allowance of all the pending claims are respectfully requested.

Entry of the above amendments is earnestly solicited. Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

YOUNG & THOMPSON

Roland E. Long, Jr., Reg. No. 41,949
745 South 23rd Street
Arlington, VA 22202
Telephone (703) 521-2297
Telefax (703) 685-0573
(703) 979-4709

REL/mjr
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APPENDIX:

The Appendix includes the following item(s):

- a Replacement Sheet for Figure 2 of the drawings

AMENDMENTS TO THE DRAWINGS:

The attached sheet of drawings includes changes to Figure 2. This sheet, which includes Figures 1 and 2, replaces the original sheet including Figures 1 and 2.

Drawing Figure 2 has been amended to more clearly show the features recited by claims 1 and 7.

Attachment: Replacement Sheet